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AUTHOR Soltesz, Christine
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ABSTRACT

To determine whether remedial readers in the Kean College (New Jersey) reading clinic made a significant gain in reading, 70 sample cases were taken from the 128 most recent remediation case studies in the files of the clinic. The sample included only students attending the diagnostic sessions and one remediation session. The remediation sessions consisted of a minimum of 13 sessions of approximately 1.5 hours. Each student's total reading mastery score from the Woodcock Reading Mastery Tests was recorded and converted to a standard score. Residual gain was then determined. Results showed that 65% of the students demonstrated residual gain. It was concluded that although remediation included only 13 sessions, when statistical measures were employed, the majority of remedial students demonstrated residual gain. (HOD)

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RESIDUAL GAIN OF REMEDIAL STUDENTS AT KEAN COLLEGE READING CLINIC

by

Christine Soltesz

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CHAPTER I
INTRODUCTION

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INTRODUCTION

I. STATEMENT OF THE PROBLEM

Do fifty percent of the remedial readers in Kean College Reading Clinic make a significant gain in reading as measured by the Woodcock Reading Mastery Tests? (1973)

II. HYPOTHESIS

There is a significant gain in reading ability in fifty percent of the remedial readers attending Kean College Reading Clinic.

III. SIGNIFICANCE OF THE PROBLEM

The purpose of this study was to evaluate statistically the gains made by students attending Kean College Reading Clinic. It will provide feedback to those who are interested in the reading clinic, especially the director, the faculty and staff involved.

IV. DEFINITIONS

Reading Achievement

Reading Achievement is defined as a standardized average score as measured by the Woodcock Reading Mastery Tests.

Gain

Gain is defined as a measure of change determined statistically.

Residual Gain

Residual Gain is defined by Rankin (1965) as the deviation of the observed posttest score from the posttest score that is predicted from the pretest score.

V. ASSUMPTIONS

It was assumed that the information was objectively and accurately recorded.

VI. LIMITATIONS

The study included only a small sample of students. Gains were based on the results of the Woodcock Reading Mastery Test only and did not include

additional facotors such as improved attitudes towards reading, improved confidence, increased interest in reading, etc.

VII. DELIMITATIONS

The results of this study apply only to the sample of seventy students of the Kean College Reading Clinic during the time span considered. These results may not be applicable to any other clinic.

CHAPTER II

RELATED LITERATURE

CHAPTER II

RELATED LITERATURE

A search for related literature revealed information regarding various methods of measuring change as well as the various needs of Reading Clinics: their goals, means of diagnosis, remediation and evaluation, and the populations they serve.

Engh (1972) reports the approach of the Milwaukee Reading Center Program as a "total" program in that while improvement in a child's reading skill is central, the program has a broader impact, helping the child develop mentally, emotionally, and personally. Engh stated that positive parent reaction and improved student attitude were an indication of the program's success.

Krippner (1970) attempted to determine whether such variables as intelligence, social competency, vocabulary, mental health, socio-economic status, chronological age, grade placement, and amount of reading retardation were related to the degree of improvement manifested in a remedial program. Students attended a six week summer reading clinic over a three year period, receiving one hour of individual instruction followed by one hour of

group instruction daily. The California Reading Tests Form W or Form X were employed as pretest and posttest. Although the clinic report spans three years, the main statistical examination was done on the basis of students who were attending the reading clinic for the first time. A significant correlation between non-verbal intelligence (as measured by WISC Performance IQ) and reading improvement was noted. Krippner stated this was probably a reflection of the extra attention and specialized techniques employed.

Cronbach and Furby (1970) examine various procedures for estimating measures of change. Measures of raw gain, posttest minus pretest and correction by simple regression formulas are reported to have little use. A better estimate of change would be to consider variables. It was reported that one should be most interested in the true difference scores, having two components; the first, a predicted score, one entirely dependent on the true score, and the second, a score independent of the true score. When it is necessary to identify individuals with exceptionally high or low residual gains the raw residual gain is suggested. A superior formula if given to estimate the individual's true residual gain.

The usefulness of predicted or expectancy for formulas was reported by Rodenborn (1974). A comparison

of three formulas was given: the Harris (1961) Mental Age Formula, Bond-Tinker (1967) Intelligence times number of years in school plus one, and the Alice Horn (1954) relation of Mental and Chronological Age. It was suggested that the Bond-Tinker would insure more children of lower I.Q. levels be included in a remedial program and more children of high I.Q. levels would be excluded. Harris Formula would have an opposite effect, and the Horn Formula would produce a midway prediction of Bond-Tinker and Harris.

Rodenborn stated that the use of the Bond-Tinker Formulas in estimating the expectancy of low I.Q. children is probably justified since children with reading problems tend to do poorly on many intelligence tests that include reading, meaning vocabulary or prior learning in school type information. However, Rodenborn continues, the use of Bond-Tinker formulas in estimating potential for above average children or in evaluating school programs is of questionable reliability. It was suggested in determining expectancy for individual children that all three methods be employed and a more accurate range be identified.

The Rankin and Tracy (1965) report demonstrates that residual gains have advantages over crude gains. Residual gain is the deviation of the observed posttest score from the posttest score that is predicted from the pretest score, whereas the crude gain is the difference

between scores on the pretest and posttest. Using the residual gain rather than the crude gain reduces the chance of error measurement.

Due to the limitations of crude gain measurement, (i.e. increments on pre and posttest scores are not equivalent, chance of error of measurement, and initial student differences not taken into account), residual gain appears advantageous. A sample of seventy-five students enrolled in the college reading improvement program at Texas Christian University were fiven the Diagnostic Reading Test, Form E as pretest and Form B as posttest, using the comprehension subscore. Negative residual gain scores do not represent lack of improvement, but instead indicate posttest scores were lower than predicted on the basis of pretest scores. More than fifty percent of the scores were in agreement when comparing crude gain and residual gain, especially for students receiving grade C than for those who received either above or below average grade.

Carpenter, Gray, and Galloway (1974) discuss the limitations of crude score and percent gain, as reported by Manning, DuBois (1962) Rankin and Tracy (1965) and Taschow (1969). Crude scores and percent scores tend to overestimate or underestimate individual reading improvement, whereas they report the residual gain as a more reliable measurement of individual gain.

Carpenter, Gray and Galloway employed a sample of 130 elementary school children in grades two to six in a small school in South Carolina, comparing the crude gain method and the residual method. The pretest was given September 1969 and the posttest May 1970, using the Gates MacGinities Reading Tests Primary B and C and Survey D. Individual crude gain and residual gain were made by the computational method and converted to Z scores. Scores differed on all grade levels, however when scores were converted to standard scores there was no significant difference. Therefore this study showed that residual gain appeared to be no more effective than crude gain in measuring reading progress at the elementary level.

Another method of measurement stated by Ekwall (1972) is the ratio of learning, a measurement of children's learning ratio prior to entering a special program versus their learning rate while they are in the program. Due to the unreliability of group test scores for individual students, Ekwall proposed seven steps in determining a ratio of learning for the entire case load. 1. Determine the average number of years that all children to be tutored have been in school at the beginning of the program. 2. Determine the average number of years of achievement of the group when they entered the program determined by the pretest. 3. Divide the number of years of achievement

for the group by the average of years that children have been in school. 4. Determine how long the children were in the remedial program. 5. Determine the average gain per pupil during tutoring programs using the posttest scores. 6. Determine the ratio of learning during the tutoring period by dividing the amount gained during the program by the number of years or months the students were in the program. 7. Compare the students' ratio of learning during the program. This method may be employed when a control group method is not possible.

Stebens and Belden (1970) reported their study of three hundred ninety-three students enrolled in Oklahoma State University Reading Improvement Program. The pretest given in 1963 was the Nelson-Denny Reading Test Form A and the posttest given in 1965 was Form B. The experimental group were those students who completed the reading improvement course and the control group were those students still enrolled at the University who did not take the program.

A comparison of scores indicated both groups realized significant improvement in reading skills. A comparison of the difference existed in the degree of improvement in the group. It was reported that gains realized by the experimental group in comprehension

significantly exceeded the .05 level of confidence gains realized by the control group. Stebens and Belden concluded that although academic experience and maturation may account for part of the gains, formal training significantly affects gain.

An Interim Evaluation performed at the Northwest Missouri State College (1972) stated their purpose that students identified as retarded in reading will increase their reading achievement at a predicted level based on accumulated data and diagnostic results. The program consisted of diagnosis of reading disabilities, (referrals involved parents and school administrators) remedial services as well as in-service activities. Eight weeks during the summer of 1971 thirty-two cases were formally diagnosed. Only those cases with a minimum of three months treatment were included in the study (seventeen cases). Eight-eight percent of the cases did increase their reading achievement above the predicted level for the period of remediation.

Logan (1975) evaluated the Title I program in the Cleveland School District in order to assess the extent to which clinic fulfills its objectives, to describe through objective means and statistical analysis the amount of reading growth pupils achieved, and to inform clinic staff and others of the current status of the reading clinic.

The study included the children referred by their home schools (schools in which they were enrolled and attended) in Cleveland Public School 1968-74. The study reports 465 children attended in the school year 1968-69 and 2,356 in 1973-74. Students must be at least one year below grade level placement in reading. Scholastic aptitude must be within average or above average range. Pretests and posttests were identified as the Gates McKillop Diagnostic Reading Tests Forms I and II, Wisc and/or Cognitive Ability Tests - Multi-Level, pre and post Gates-MacGinitie Reading Tests.

A comparison was made of the achievement data showing pre and post reading progress levels with pupil expectancy as established by the Bond-Tinker Formula. That thirty-eight to sixty-one percent of the pupils were two and more years below their reading expectancies was reported in the review of evaluation samples from 1968 through 1974. Within that same time span from thirty-seven to sixty percent of the pupils achieved criterion level within one year above their reading expectancies. In a follow-up, Gates-MacGinitie Reading Test illustrated that the mean standard score for these students was stanine 5 at the end of the year.

An evaluation of the Summer School Program in Davies County, Owensboro Kentucky 1978-79 school year (abram 1979)

included students in the first through seventh grades, approximately 900 students. Criteria for entrance into the program included having three stanines in the CTBS or the teacher's judgment that student performance was below one level. The control group were those students who met the criteria for entrance into the program and did not attend but remained enrolled in the Davies County school. The pretest utulized was the Comprehensive Test of Basic Skills (published by McGraw Hill) in the Spring 1978 and the posttest Form T, Fall of 1978 and January 1979.

The results reported were an increase in both reading and math stanine scores when data for all students enrolled in the summer school program were grouped together. The reading increase between groups was statistically significant at the 0.012 level. Analysis of reading scores by grade level showed the summer school students had higher means than students not attending in three of the five grade level comparisons and none of these scores illustrated significance.

Berger (1975) reported a study of students in grades four through eight who demonstrated reading two and one half years below grade level. Priority was given students who had already attended Title I and who make little or insufficient progress. The study included 117 Level I students and 41 Level II students. The Stanford Diagnostic

Test Levels I and II were employed for the pretest given in September 1974 and the posttest in April 1975. In all cases the posttest menas exceeded the pretest means. Mean posttest/expected posttest difference ranged from 0.54 to 1.11 grade equivalent units.

ADDITIONAL READINGS

As material indicates there are many types of clinics: elementary public and non-public, secondary, and university clinics as well as private reading clinics.

Michael (1968) describes the functions of reading clinies. It was reported that the primary goal of reading clinics is to help disabled readers. In addition clinics also help teachers diagnose reading disabilities and recommend remediation. They help implement research on the effects of special instruction, causes of reading disabilities and the effectiveness of diagnostic tests. They may also train reading teachers, specialists, and clinicians.

To be effective Michael states they should have established sound principles, be well equipped and staffed by trained personnel. Prime consideration should be given to the cliantele, their objectives and the implementation and evaluation of these objectives.

The procedures for establishing a Reading Clinic in the Lufkin Independent School District are reported by Morrison (1970). This paper documented the study of the achievement of twelve matched pairs of second grade students. The pairs were matched by age, experiential background, and standardized achievement scores. The Standford Achievement Test and Spache Diagnostic Reading Scale were employed. After seven month period the experimental group, which received one hour of clinical instruction daily, had a significantly higher mean growth on the Stanford and Spache. A significant difference in attitude and motivation was also noted.

In another report (Hanes 1981) nine hundred fifty-four classroom teachers, resource room teachers and administrators in ten school districts near Eastern Michigan University (Ypsilanti) responded to a questionnaire concerning their need for university related assistance in reading instruction. The study revealed a concern for improved reading, a statement of observed needs for improved reading, and methods to handle reading problems.

The success of a reading clinic (Williams 1979) is dependent upon identification of specific strengths and weaknesses, individualized instruction, instructional materials and activities, and motivation. It was suggested

by Williams that although classrooms cannot provide the same conditions as a clinic, it was felt that programs be developed that can be modeled after clinic-type programs.

Another type of clinic is described by Olson (1973). After students in the University completed the university theory courses they became involved in the public school learning center as part of one of three teams: the front line team, those working directly with students; back-up teams, learning the diagnosis and remediation techniques and materials; and the research teams composed of doctoral students.

Muia and Connors (1978) explored the legal responsibilities of reading clinics to its clients and presents recommendations which clinics should follow in order to avoid future legal involvement. In the referral process, parental permission is needed for students to attend as well as for the clinic to release information to schools. Since everyone has the right to privacy, audio and video taping must be approved by parents. All information obtained in the interview is held in confidence. Parents should be assured trained people will be working with the child. Tests must be able to be defended, containing no biases. Clinic reports should be available to parents. Muia and Connors recommend that a clinic follow-up relative to a child's placement in school be done be done to prevent misuse of a report.

CHAPTER III

DESIGN OF THE STUDY

CHAPTER III

DESIGN OF THE STUDY

The Woodcock Reading Mastery Tests were utilized for clinic pre and post testing. Seventy sample cases were taken from a population of the most recent one hundred twenty-eight remediation case studies taken from the files of the Kean College Reading Clinic. The sample dates diagnosis from Spring 1978 to the most recent remediations Fall 1981. The sample included only students attending the diagnostic sessions and one remediation session. The remediation sessions consisted of a minimum of thirteen sessions of approximately one and one-half hours. Any student attending summer session or tutoring sessions were excluded. When a student attended more than one remediation session, only the first remediation session score was included in this sample. The range in chronological age for the pretest was 6-10 to 18-4 and the grade placement range was 1.2 to 12+.

Using the total Reading Mastery Score from the Woodcock Reading Mastery Tests, each sample score was recorded. A total of seventy pretest and seventy posttest scores were recorded, and the mean for each test was computed.

Utilizing the standard deviation by calculator method

$$S.D. = \sqrt{\frac{\Sigma X^2 - \frac{(\Sigma x)^2}{n}}{n-1}}$$

the standard deviation for the pretest and posttest was computed.

All scores were converted to standard scores by the formula

$$z = \frac{\text{score - mean}}{\text{standard deviation}} .$$

The reliability coefficient of the Woodcock Reading Mastery Tests for grades 1-4 was $r = .97$ and for grades 5+ was $r = .83$. The Rankin formula was used to determine residual gain:

$$\text{Residual gain} = z_2 - r(z_1)$$

z_2 = posttest score expressed as a standard score

z_1 = pretest score expressed as a standard score

r = reliability coefficient for respective grades

The percent of students making a residual gain was computed.

CHAPTER IV

ANALYSIS OF DATA

CHAPTER IV

ANALYSIS OF DATA

Seventy case studies in the sample taken from the most recent remedial students at Kean College Reading Clinic spanned a chronological age range of 6-10 to 18-4. Figure 1 indicates the range in chronological age at pretesting.

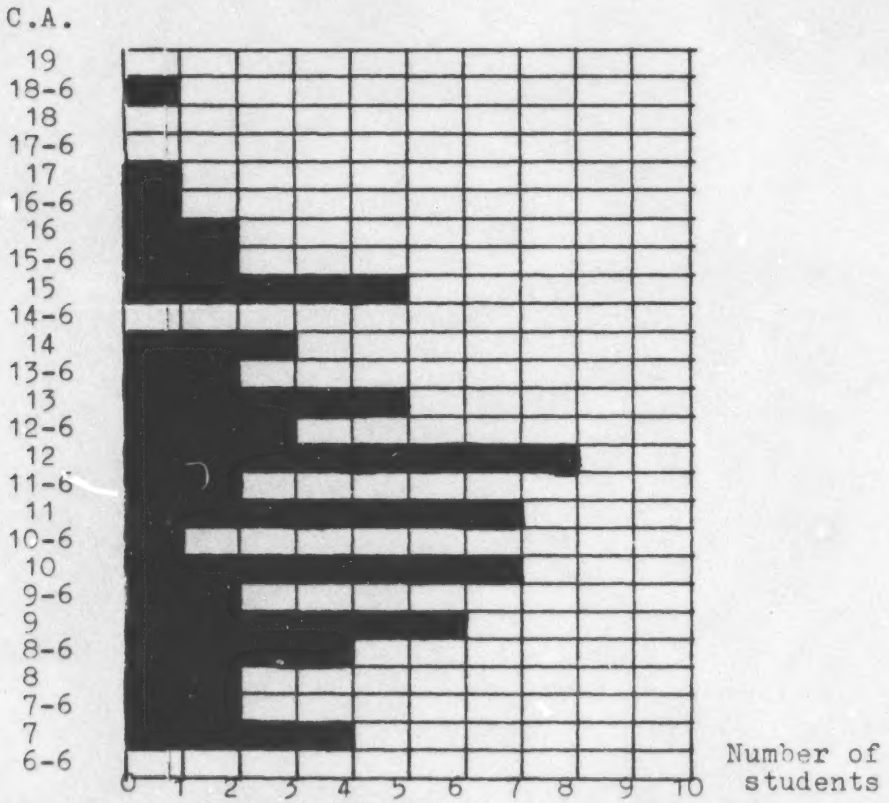

Figure 1 Chronological Age of Remedial Students attending Kean College Reading Clinic

Total Mastery Scores taken from the Woodcock Reading Mastery Tests pretest and posttest are given in Table I. The standard score for the pretest (z_1) and the standard score for the posttest (z_2) are included. The final score is residual gain.

The Pretest Mean equals 119.03 with a standard deviation of 24.25. The Posttest Mean equals 130.47 with a standard deviation of 19.17.

Thirty-nine sample cases (fifty-six percent) illustrated residual gain. Therefore I accept the hypothesis that more than fifty percent of the remedial students attending Kean College Reading Clinic demonstrated residual gain.

CHAPTER V

SUMMARY AND CONCLUSION

CHAPTER V

SUMMARY AND CONCLUSION

The purpose of this study was to evaluate statistically the gains made by students attending Kean College Reading Clinic. This report included a sample of seventy remedial students taken from the most recent one hundred twenty-eight case studies from Kean College Reading Clinic. Students who attended diagnosis and were found not to be in need of remediation were excluded. Also exempt from the study were those students who attended summer sessions or additional tutoring sessions. In the cases where students received more than one remediation, only the first remediation results were included.

The Total Reading Mastery Scores from the Pretests and Posttests were recorded from the Woodcock Reading Mastery Tests. These scores were then transcribed to standard scores. Utilizing the Rankin formula, residual gain was determined. Fifty-six percent of the students demonstrated residual gain.

In conclusion, although remediation includes only a minimum of thirteen sessions and progress by remedial students is often slow, the majority of remedial

students attending Kean College Reading Clinic demonstrated residual gain when employing statistical measures. Since the majority of students attending the clinic for one set of remediation sessions made statistical improvement, it would be interesting to observe gains made by students receiving more than one set of remediation sessions.

BIBLIOGRAPHY

Abram, Marie J., and Cobb, Robert, "Evaluating a Summer School Program for Elementary Students Achieving Below Grade Average", PREPS Research Project, 1978-79.

Berger, Kenneth, "Central 1974-1975 Title I Remedial Services for Eligible Nonpublic School Pupils; Reading Skills Center Component", Office of Education Evaluation, New York, 1975, 29p.

Carpenter, T.W., Gray, G., and Galloway, E., "A Comparison of Individual Reading Gain", Reading Teacher, 27, (January 1974), 368-369.

Cronbach, Lee J., and Furby, Lita, "How We Should Measure Change - Or Should We?", Psychological Bulletin,74 (1970), 68-80.

Ekwall, Eldon K., "Measuring Gain in Remedial Reading", Reading Teacher, 26, (November 1972), 138-141.

Engh, Jeri, "Reading: An Inner City's Total Approach", American Education, (December 1972), 16-20.

Hanes, Madlyn Levine and Muller, John D., "The University Reading Clinic: A Needed and Viable Means of Servicing Community and Schools", A paper presented at the annual meeting of the American Education Research Association, Los Angeles, California, April 13-17, 1981, 20p.

Krippner, Stanley, "Reading Improvement: Its Correlates", Perceptual and Motor Skills, (December 1970) 727-731.

Logan, Juanita E., "Monitoring Process and Assessing Product", Paper presented at the Annual Meeting of the International Reading Association, New York City, May 13-16. 1975, 15p.

Michael, Lois I., "Reading Clinics - - Helping the Disabled Reader Through Special Service", Paper presented at the International Reading Association Conference, Boston, Massachusetts, April 1968, 10p.

Morrison, Lois, "Staffing, Equipping, and Cperating Public School Reading Clinics", Paper presented at the conference of the International Reading Association, Anaheim, California, May 1970.

Muda, Joseph Anthony and Connors, Eugene T., "Legal Entanglements of Reading Clinics' Diagnostic Procedures", Journal of Reading, (January 1978), 321-328.

Northwest Missouri State College, Maryville, "Childrens Reading Clinic, Interim Evaluation Report for Period July 1, 1971 - June 31, 1972", (August 1972) 11p.

Olson, Joanne et al., "University Reading Clinics - A New Look, Study prepared at the University of Houston, (1973), 10p.

Pikulski, John., "Criterion Referenced Measures for Clinical Evaluations", Reading World, (December 1974), 116-128.

Rankin, E.F. and Tracy, R.J., "Residual Gain as a Measure of Individual Differences", Journal of Reading, (March 1965), 224-233.

Rodenborn, Leo V., "Determining, Using Expectancy Formulas", Reading Teacher, (December 1974), 286-291.

Stebens, L.D. and Belden, B.R., "Retention of Gains in Reading After Five Semesters", Journal of Reading, (February 1970), 339-344.

Taschow, H.G. "A Comparison of Individual Reading Improvement Scores on a Group of Community College Freshmen as Measured by Crude Gain Method and the Residual Method.", Eighteenth Yearbook, National Reading Conference Inc., Marquette University, Milwaukee, Wisconsin, 1969, 27-37.

Williams, Lana, "Reading Clinic in the Classroom", Reading World, 18: (May 1979), 389-392.

APPENDIX

TABLE I

RAW SCORE, Z SCORE, AND RESIDUAL GAIN
OF REMEDIAL STUDENTS ATTENDING
KEAN COLLEGE READING CLINIC

	C.A.	Prestest		Posttest		Residual Gain
		Total Mastery Score	z_1	Total Mastery Score	z_2	
1	10	127	.33	139	.44	.17
2	7	94	-1.03	114	-.86	.14
3	11	135	.66	138	.39	-.16
4	8-1	93	-1.07	107	-1.22	-.18
5	16-4	150	1.28	157	1.38	.32
6	12-2	112	-.29	126	-.23	.01
7	15	147	1.15	147	.86	-.09
8	10	103	-.66	109	-1.12	-.57
9	11	123	.16	143	.65	.52
10	14-11	143	.99	145	.76	-.06
11	13	137	.74	152	1.12	.51
12	12-11	144	1.03	150	1.02	.17
13	11-10	125	.25	136	.29	.08
14	15-1	142	.95	146	.81	.02
15	12-11	141	1.03	146	.81	-.04
16	10-4	128	.37	127	-.18	-.49
17	10	132	.53	141	,55	.11
18	15-4	155	1.48	157	1.38	.15
19	8-6	109	-.41	122	-.44	-.04
20	15-11	144	1.03	143	.65	-.20
21	13	141	.91	151	1.07	.31
22	13-4	153	1.40	170	2.06	.90
23	11	137	.74	141	.55	-.06
24	9	131	.49	136	.29	-.12

	C.A.	Pretest		Posttest		Residual Gain
		Total Mastery Score	z_1	Total Mastery Score	z_2	
25	9-7	103	-.66	112	-.96	-.41
26	13-6	144	1.03	148	.91	.06
27	14-11	138	.78	147	.86	.21
28	8-10	82	-1.53	102	-1.49	-.01
29	17	139	.82	151	1.07	.39
30	11-7	98	-.87	140	.50	1.22
31	9-7	132	.53	140	.50	-.01
32	14	139	.82	144	.71	.03
33	7-8	49	-2.89	79	-2.68	.12
34	7-2	58	-2.52	87	-2.27	.17
35	12-8	130	.45	136	.29	-.08
36	8-3	82	-1.53	88	-2.22	-.74
37	12	89	-1.24	118	-.65	.38
38	9-11	101	-.74	117	-.70	.02
39	11	121	.08	134	.18	.11
40	11-2	108	-.45	116	-.75	-.38
41	14	142	.95	147	.86	.07
42	10-11	135	.66	147	.86	.31
43	8-6	86	-1.36	112	-.96	.36
44	6-10	81	-1.57	97	-1.75	-.21
45	11	129	.41	142	.60	.26
46	11-8	119	-.04	128	-.13	-.12
47	8-4	105	-.58	117	-.70	-.14
48	15-10	143	.99	150	1.02	.20
49	13-11	146	1.11	157	1.38	.46
50	9	123	.16	123	-.39	-.55
51	12	116	-.12	112	-.08	.02
52	12-1	86	-1.36	95	-1.85	-.72
53	13-4	132	.53	142	.60	.16

	C.A.	Prestest		Posttest		Residual Gain
		Total Mastery Score	z_1	Total Mastery Score	z_2	
54	7-4	87	-1.32	117	-.70	.58
55	8-6	105	-.58	119	-.60	-.04
56	9-1	105	-.58	114	-.86	-.30
57	12-8	125	.25	132	.08	-.13
58	14-8	142	.95	148	.91	.12
59	12	128	.37	134	.18	-.13
60	9-3	108	-.45	118	-.65	-.21
61	12-1	145	1.07	151	1.07	.18
62	10-3	93	-1.07	108	-1.17	-.13
63	10	112	-.29	127	-.18	.10
64	12-4	132	.53	129	-.08	-.52
65	6-11	55	-2.64	91	-2.06	.50
66	12	114	-.21	128	-.13	.04
67	12-6	106	-.54	117	-.70	-.25
68	10	118	-.04	133	.13	.16
69	15-6	133	.58	149	.97	.49
70	9	122	.12	130	-.02	-.14

Pretest Mean = 119.03

Posttest Mean = 130.47

Pretest S.D. = 24.25

Posttest S.D. = 19.17